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Volume V

1949

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HERPETOLOGICA

Established 1936
Organ of the HERPETOLOGISTS LEAGUE, A. A. A. S. Associate
Published and Edited by Chapman Grant
2970 Sixth Ave., San Diego 3, California

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Vol. 5 February 1, 1949 Part 1

LONGEVITY RECORDS FOR REPTILES AND AMPHIBIANS IN THE PHILADELPHIA ZOOLOGICAL GARDEN

By Roger Conant and Robert G. Hudson

Relatively little information has been published on the longevity of reptiles and amphibians, and it truly may be said that the average and maximum life spans of only a handful of species are known with any degree of accuracy. In recent years considerable attention has been given to the marking of large numbers of individual specimens, liberating them, and then attempting to recapture them at later dates. Several papers based upon the techniques and results of such activities have appeared (Blanchard and Finster, 1933; Cagle, 1939; Stickel and Cope, 1947; etc.), and they have served to stimulate interest in the duration of life, wanderings, migrations, etc. of reptiles and amphibians in nature. Because they are anatomically best suited to receive and retain the markings applied by the investigators, turtles have been most often used, and probably more is known about them than any of the other groups.

It is from captive specimens, however, that most data have been gleaned. Conditions of cage life are in few respects similar to those that prevail in the wild. The absence of predators, the abundance of food, the fact that heat is supplied during winter months and hence specimens from the temperate zone are not subjected to the annual rhythm of hibernation - these and other factors must all be taken into consideration. It is nonetheless true that the length of time that reptiles and amphibians survive in captivity is indicative, in a measure, of their normal expectations of life. Whereas numerous specimens do poorly, it is a well-known fact that individuals of many species become adjusted to a caged environment and survive for surprisingly long periods.

Several reports upon the duration of life among zoo specimens have been published (a number are included in the list of references). We present, herewith, similar data based on reptiles and amphibians that have survived for creditable lengths of time in the Philadelphia Zoological Garden or whose records are of interest. Our information is derived chiefly from two sources: (1) the ledgers of livestock in the Zoo's collection, and which have been kept since the opening of the Garden on July 1, 1874; and (2) the records accumulated by us during the periods that the specimens living in the reptile house have been

under our close observation (more than thirteen years in the case of the senior author).

We are well aware that the chief stumbling block of any inventory system involving living animals lies in the fact that individual specimens often cannot be identified with accuracy. Thus, the Philadelphia Zoo has always exhibited alligators, but it is not known how long any one of them lived. Most were received as juveniles that grew large and eventually died, but no system of tagging has ever been instituted that would make it possible to determine which alligator is which. In all such cases (and there have been many of them, especially among the more common snakes and turtles) we have been particularly cautious and have doubtless discarded many valid records simply because it is impossible to be sure.

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On the other hand, there are many cases in which the identification of the individual is easily established. Variations in sizes, markings, scars, or other blemishes, temperament, or, notably, the fact that certain specimens were the only ones of their kind on exhibition, have all rendered simple the task of keeping track of innumerable reptiles and amphibians. All doubtful cases have been eliminated from the listings below.

Some records on the longevity of reptiles in the Philadelphia Zoo have been published in the reports of the Penrose Research Laboratory, and, unfortunately, a number of these (especially in the report dated 1939) are in error. So, for the sake of accuracy, we have rechecked the original source material, and the data included herewith may be considered as correcting and superseding mistakes in the Laboratory reports.

Wherever possible we have brought the nomenclature up to date, but there are some instances in which it has seemed advisable to retain the designation originally assigned to certain individual specimens. Also we have used binomials in all cases wherein it has been impossible to ascertain which subspecies was on exhibition. Arthur Erwin Brown, one of the most eminent herpetologists of his day, identified the reptiles and amphibians in the period from 1876 to 1910, during his term as Superintendent and (later) General Manager of the Zoological Garden. Many of the more outstanding records were achieved during the stewardship of Robert Hess, Reptile House Keeper for 42 years.

The species in each group are listed alphabetically. Periods of survival in captivity are expressed in years and months; for example, 5 - 2 stands for 5 years and 2 months. All records are calculated to the nearest month. An asterisk (*) indicates that the specimen (or specimens) was still living on December 31, 1948. Notable records from the literature (chiefly from Flower) are subtended in many cases. There are scarcely any zoos maintaining reptile collections that have not achieved noteworthy success with one or more species. Without a doubt some of their longevity records will exceed ours, and it is hoped that the appearance of this paper will stimulate the publication of similar lists.

SALAMANDERS

Ambystoma t. tigrinum Green; TIGER SALAMANDER 10 - 4
Blanchard (1932) - 11 yr.

Amphiuma means Garden; CONGO "EEL" 14 - 7, two others 12 - 9
Flower (1925) - 26 yr. 9 mo. 24 d.

Siren lacertina Linné; GREAT SIREN 7 - 11*
Flower (1925) - 24 yr. 6 mo. 21 d.

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FROGS AND TOADS

Bufo alvarius Girard; GIANT TOAD 2 - 0
Bufo boreas Baird and Girard; NORTHWESTERN TOAD 6 - 0
Bufo compactilis Wiegmann; SONORAN TOAD 4 - 3
Bufo marinus Linné; MARINE TOAD 8 - 2*
Perkins (1947) - 15 yr.
Bufo peltacephalus Tschudi; CUBAN TOAD 13 - 2
Hyla cinerea Schneider; GREEN TREE FROG 6 - 3
Hyla gratiosa LeConte; FLORIDA TREE FROG 5 - 11
Hyla septentrionalis Boulenger; GIANT TREE FROG 6 - 9
Leptodactylus pentadactylus Laurenti; RED-SPOTTED FROG 15 - 9
Flower (1925) - 8 yr. 4 mo. 5 d.; Flower (1936) - "about 12 yrs."
Microhyla carolinensis Holbrook; NARROW-MOUTHED TOAD 6 - 1
Scaphiopus couchii Baird; COUCH'S SPADEFOOT TOAD 3 - 4
Pipa pipa Linné; SURINAM TOAD 6 - 9
Flower (1936) - 7 yr. 10 mo. 8 d.
Xenopus laevis Daudin; CLAWED FROG 8 - 9*
Flower (1936) - 15 yr.

CROCODILIANS

Caiman latirostris Daudin; BROAD-SNOUTED CAIMAN 22 - 1
Flower (1925) - 8 yr. 3 mo. 10 d.
Caiman sclerops Schneider; COMMON SPECTACLED CAIMAN 16 - 7 and another 15 - 10
Flower (1937) 13 yr. 8 mo. 24 d.
Crocodylus acutus Cuvier; AMERICAN CROCODILE 13 - 6
Flower (1937) - 10 yr. 8 mo. 17 d.
Crocodylus moreletii Duméril; MORELET'S CROCODILE 3 - 11
Crocodylus palustris Lesson; MARSH CROCODILE 13 - 5
Flower (1925) - 30 yr. 11 mo. 15 d.
Crocodylus porosus Schneider; SALT-WATER CROCODILE 7 - 7
Flower (1937) - 15 yr. 7 mo. 28 d.
Osteolaemus tetraspis Cope; BROAD-FRONTED CROCODILE 33 - 5
Flower (1937) - 24 yr.
Paleosuchus palpebrosus Cuvier; CUVIER'S SMOOTH-FRONTED CAIMAN 2 - 5
Flower (1925) - 5 yr. 10 mo. 24 d.

TURTLES

Chelodina longicollis Shaw; AUSTRALIAN SIDE-NECKED TURTLE 31 - 5*
Flower (1937) - 36 yr. 9 mo 22 d.
Chelys fimbriata Schneider; MATAMATA 10 - 4
Flower (1937) - 7 yr. 1 mo. 28 d.
Chrysemys picta bellii Gray; WESTERN PAINTED TURTLE 8 - 11
Flower (1937) - 11 yr. 3 mo. 10 d
Clemmys bealei Gray; BEALE'S TURTLE 27 - 4
Clemmys insculpta LeConte; WOOD TURTLE 13 - 5*
Mann (1934) - 5 yr. 10 mo.
Cyclemys amboinensis Daudin; EAST INDIAN BOX TURTLE 19 - 11
Flower (1925) - 19 yr. 1 mo. 17 d.
Emys blandingii Holbrook; BLANDING'S TURTLE 11 - 7*
Geoclemys reevesii Gray; REEVE'S TERRAPIN 24 - 3
Flower (1925) - 23 yr. 6 mo. 2 d.
Gopherus agassizii Cooper; DESERT TORTOISE 2 - 9
Mann (1934) - 2 yr. 3 mo.
Gopherus polyphemus Daudin; GOPHER TORTOISE 8 - 6*
Mann (1934) - 4 yr. 7 mo.

Graptemys pseudogeographica Gray; MISSISSIPPI MAP TURTLE 21 – 6*
Hydraspis hilarii Duméril and Bibron; HILARY'S SIDE-NECKED TURTLE 20 - 10
Flower (1925) - 13 yr. 10 mo. 28 d.
Hydromedusa tectifera Cope; ARGENTINE SIDE-NECKED TURTLE 8 - 10
Flower (1925) - 10 yr.
Kinixys belliana Gray; BELL'S HINGE-BACKED TORTOISE 9 - 9
Flower (1937) - 9 yr. 3 mo. 28 d.
Kinixys erosa Schweigger; ORNATE HINGE-BACKED TORTOISE 3 - 5
Kinosternon scorpiodes Linné; SOUTH AMERICAN MUD TURTLE 9 - 1
Flower (1937) - 17 yr. 8 mo.
Kinosternon sonoriense LeConte; SONORAN MUD TURTLE 21 - 9
Mann (1934) - 5 yr. 3 mo.
Macochelys temminckii Troost; ALLIGATOR SNAPPING TURTLE 58 – 8* and another 47 - 7
Flower (1925) - 42 yr.
Malacochersus tornieri Siebenrock; SOFT-SHELLED TORTOISE 7 - 4
Flower (1937) - 7 yr. 5 mo. 6 d. = *Testudo tornieri*
Pelomedusa subrufa Lacépède; SIDE-NECKED TURTLE 10 - 2
Flower (1925) - 16 yr. 10 mo. 11 d. = *P. galeata*
Pelusios subniger Lacépède; BLACK SIDE-NECKED TURTLE 29 - 3 and another 22 – 1*
Flower (1937) - 40 yr. 8 mo. 13 d. = *P. derbianus*
Pseudemys floridana concinna LeConte; RIVER TURTLE 5 - 0
Pseudemys floridana mobilensis Holbrook; MOBILE TURTLE 12 - 6
Sternotherus carinatus Gray; KEELED MUSK TURTLE 5 - 6
Sternotherus odoratus Latreille; MUSK TURTLE 53 – 3*
Pope (1939) - 23 yr.
Terrapene carolina triunguis Agassiz; THREE-TOED BOX TURTLE 6 - 2
Testudo hoodensis (?) Van Denburgh; HOOD ISLAND TORTOISE 16 – 8*
Testudo radiata Shaw; RADIATED TORTOISE 8 - 7
Flower (1925) - 9 yr. 9 mo. 4 d.; Flower (1937) - "circa 10 yr."

LIZARDS

Amphibolurus barbatus Cuvier; BEARDED DRAGON 3 - 3
Flower (1937) - 2 yr. 3 mo. 11 d.
Anguis fragilis Linné; SLOW WORM 8 - 4
Flower (1937) - 32 yr.
Anolis equestris Merrem; GIANT ANOLIS 3 - 5
Anolis luteogularis Noble and Hassler; HASSLER'S ANOLIS 2 - 11
Basiliscus vittatus Wiegmann; BANDED BASILISK 5 - 11
Mann (1934) - 3 yr. 3 mo.
Chalcides ocellatus Forskal; SAND SKINK 3 - 9
Flower (1937) - 9 yr. 6 mo.
Conolophus subcristatus Gray; GALÁPAGOS LAND IGUANA 7 - 3
Perkins (1947) - 15 yr. 1 mo.
Cordylus giganteus Smith; GIANT GIRDLE-TAIL 5 - 3
Flower (1925) - 4 yr. 6 mo. 19 d.
Cyclura macleayi Gray; CUBAN IGUANA 3 - 5
Dracaena guianensis Daudin; ALLIGATOR TEGU 8 - 6
Flower (1937) - 3 yr. 11 mo. 19 d.
Egernia cunninghami Gray; CUNNINGHAM'S SKINK 10 - 2
Flower (1925) - 19 yr. 11 mo. 4 d.
Heloderma horridum Wiegmann; MEXICAN BEADED LIZARD 9 - 0
Flower (1937) - 3 yr. 3 mo.

Heloderma suspectum Cope; GILA MONSTER 20 - 0
Mann (1934) - 19 yr. 4 mo.
Iguana iguana iguana Linné; COMMON IGUANA 3 - 3
Flower (1937) - 4 yr. 2 mo. 11 d.
Leiocephalus carinatus Gray; CURL-TAILED LIZARD 3- 9
Lygosoma casuarinae Duméril and Bibron; TASMANIAN SKINK 5 - 4
Ophisaurus apodus Pallus; EUROPEAN GLASS LIZARD 11 - 7*
Perkins (1947) - 24 yr.
Ophisaurus ventralis Linné; GLASS LIZARD 3 - 9
Physignathus lesueurii Gray; LESUEUR'S WATER LIZARD 4 - 3
Flower (1937) - "over 6 yr."
Tarentola mauritanica Linné; MOORISH WALL GECKO 4 - 2
Flower (1925) - 7 yr. 5 mo. 9 d.
Tiliqua scincides Shaw; BLUE-TONGUED LIZARD 8 - 9
Flower (1925) - "over 17 yr."
Trachysaurus rugosus Gray; STUMP-TAILED LIZARD 7 - 11
Flower (1937) - "nearly 8 yr."; Flower (1925) - 7 yr. 1 mo. 14 d.
Tupinambis nigropunctatus Spix; BLACK-SPOTTED TEGU 11 - 11
Flower (1925) - 5 yr. 4 mo. 23 d.; Flower (1937) - "over 10 yr."
Tupinambis teguixin Linné; COMMON TEGU 7 - 7
Flower (1925) - 12 yr. 11 mo. 16 d.
Varanus bengalensis Daudin; COMMON INDIAN MONITOR 5 - 6
Varanus niloticus Linné; AFRICAN MONITOR 5 - 10
Flower (1925) - 6 yr. 5 mo. 20 d.; Flower (1937) - "probably about 15 yr."
Varanus varius Shaw; LACE MONITOR (GOANA) 6 - 7
Flower (1925) - 6 yr. 9 mo. 3 d.; Flower (1937) - "probably about 15 yr."

SNAKES

Acrantophis madagascariensis Duméril and Bibron; MADAGASCAN BOA 8 - 8
Flower (1925) - 19 yr. 5 mo. 17 d.
Agkistrodon mokeson laticinctus Gloyd and Conant; BROAD-BANDED COPPERHEAD 6 - 6*
Agkistrodon mokeson mokeson Daudin; NORTHERN COPPERHEAD 5 - 5*
Flower (1925) - 10 yr. 11 mo. * *A. contortrix*; Perkins (1947) - 10 yr. 8 mo.
Alsophis portoricensis Reinhardt and Lutken; PUERTO RICAN RACER 2 - 1
Bitis arietans Merrem; PUFF ADDER 5 - 1
Flower (1937) - 13 yr. 11 mo. 16 d.
Boa annulata Cope; RINGED TREE BOA 12 - 4
Boa canina Linné; EMERALD BOA 3 - 6
Boa enydris enydris Linné; BROWN TREE BOA 8 - 0
Boiga blandingii Hallowell; BLANDING'S TREE SNAKE 2 - 1
Boiga dendrophila Boie; MANGROVE SNAKE 8 - 7*
Clelia clelia Daudin; MUSSURANA 6 - 0*
Constrictor constrictor constrictor Linné; BOA CONSTRICTOR 12 - 3
Flower (1925) - 23 yr. 3 mo. 23 d.
Constrictor constrictor imperator Daudin; CENTRAL AMERICAN BOA 2 - 10
Mann (1934) - 2 yr. 5 mo.
Crotalus atrox Baird and Girard; WESTERN DIAMOND RATTELSNAKE 6 - 8
Perkins (1947) - 10 yr. 8 mo.
Crotalus viridis viridis Rafinesque; PRAIRIE RATTLESNAKE 2 - 2
Dendroaspis viridis Hallowell; GREEN MAMBA 4 - 0
Flower (1925) - 3 yr. 10 mo.
Drymarchon corais corais Boie; CRIBO 2 - 3

Drymarchon corais melanurus Duméril and Bibron; TROPICAL INDIGO SNAKE 9 - 0
Elaphe guttata Linné; CORN SNAKE 19 – 4*
Stabler (1939) - 5 yr.
Elaphe laeta Baird and Girard; EMORY'S RAT SNAKE 2 - 2
Elaphe longissima Laurenti; AESCULAPIAN SNAKE 3 - 3
Flower (1925) - 3 yr. 11 mo. 17 d.
Elaphe obsoleta confinis Baird and Girard; GRAY RAT SNAKE 4 - 6
Elaphe obsoleta lindheimerii Baird and Girard; LINDHEIMER'S RAT SNAKE 4 - 11
Elaphe obsoleta obsoleta Say; PILOT BLACK SNAKE 5 – 8*
Stabler (1939) - 5 yr.
Elaphe quatuorlineata Lacépède; FOUR-LINED SNAKE 5 - 2
Flower (1925) - 4 yr. 7 mo. 6 d.
Epicrates angulifer Cocteau and Bibron; CUBAN BOA 5 - 1
Mann (1934) - 11 yr. 9 mo.
Epicrates cenchria Linné; RAINBOW BOA 10 - 10
Perkins (1947) - 10 yr. 3 mo. = *E. c. maurus*
Epicrates striatus Fischer; FISCHER'S TREE BOA 16 - 0
Eunectes barbouri Dunn and Conant; BARBOUR'S ANACONDA 13 - 11
Eunectes deschauenseei Dunn and Conant; DESCHAUENSEE'S ANACONDA 13 - 10
Eunectes murina Linné; ANACONDA 14 - 10
Mann (1934) - 28 yr.
Farancia abacura Holbrook; MUD SNAKE 3 - 2
Helicops schistosus Daudin; COBRA DA AGUA 12 - 3
Lampropeltis calligaster rhombomaculata Holbrook; MOLE SNAKE 2 - 9
Lampropeltis getulus floridana Blanchard; FLORIDA KING SNAKE 2 - 3
Lampropeltis getulus holbrooki Stejneger; SPECKLED KING SNAKE 3 - 2
Lampropeltis triangulum syspila Cope; RED MILK SNAKE 4 - 10
Lampropeltis triangulum triangulum Lacepede; COMMON MILK SNAKE 8 - 9
Leptodeira annulata Linné; ANNULATED SNAKE 3 - 6
Flower (1925) - 4 yr. 11 mo. 21 d.
Loxocemus bicolor Cope; NEW WORLD PYTHON 6 – 0*
Morelia argus Linné; CARPET PYTHON 6 - 1
Flower (1937) - 13 yr. 4 mo. 28 d.
Naja haje Linné; EGYPTIAN COBRA 6 - 4
Flower (1925) - 6 yr. 3 mo. 2 d.
Naja melanoleuca Hallowell; BLACK COBRA 4 - 3
Perkins (1947) - 18 yr. 4 mo.
Naja naja Linné; INDIAN COBRA 12 - 4
Flower (1925) - 9 yr. 6 mo. 5 d. and another 12 yr. = *N. tripudians*
Naja nigricollis Reinhardt; SPITTING COBRA 6 - 2
Natrix erythrogaster erythrogaster Forster; RED-BELLIED WATER SNAKE 8 - 10
Natrix erythrogaster transversa Hallowell; BLOTCHED WATER SNAKE 4 - 3
Natrix piscator Schneider; INDIAN RIVER SNAKE 7 - 11
Flower (1925) - 9 yr. 0 mo. 26 d.
Ophiophagus hannah Cantor; KING COBRA 4 - 5
Flower (1925) - 12 yr. 7 mo. 20 d. = *Naia hannah*
Pituophis melanoleucus melanoleucus Daudin; PINE SNAKE 8 - 1
Flower (1925) - 4 yr. 6 mo.
Pseudechis porphyriacus Shaw; PURPLISH DEATH ADDER 9 - 2
Flower (1925) - 5 yr. 10 mo. 23 d.
Python curtus Schlegel; BLOOD PYTHON 3 - 6
Perkins (1947) - 11 yr.
Python molurus bivittatus Kühl; INDIAN PYTHON 13 – 6*

Python molurus molurus Linné; INDIAN PYTHON 13 - 0
Flower (1937) - 19 yr. 2 mo. 1 d.
Python regius Shaw; BALL PYTHON 5 - 0
Flower (1925) - 8 yr. 8 mo. 16 d.
Python reticulatus Schneider; RETICULATED PYTHON 18 - 9
Flower (1925) - 21 yr. 4 mo. 24 d.
Python sebae Gmelin; ROCK PYTHON 12 - 1*
Flower (1925) - 15 yr. 6 mo.
Rhinocheilus lecontei Baird and Girard; LONG-NOSED SNAKE 2 - 2
Sistrurus catenatus Rafinesque; MASSASAUGA 4 - 6
Storeria occipitomaculata occipitomaculata Storer; RED-BELLIED SNAKE 2 - 2
Thalerophis mexicanus Duméril, Bibron and Duméril; GREEN-HEADED SNAKE 6 - 4
Thamnophis butleri Cope; BUTLER'S GARTER SNAKE 2 - 0
Thamnophis radix Baird and Girard; PLAINS GARTER SNAKE 2 - 1
Thamnophis sauritus proximus Say; WESTERN RIBBON SNAKE 3 - 7
Mann (1934) - 6 yr.
Thamnophis sauritus sauritus Linné; EASTERN RIBBON SNAKE 4 - 0
Flower (1925) - 6 yr. 7 mo. 17 d. *Natrix saurita*
Trimeresurus purpureomaculatus Gray; TEMPLE VIPER 5 - 9
Tropidophis melanurus Schlegel; CUBAN DWARF BOA 2 - 5

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* * *

THE DISTRIBUTION OF MILK SNAKES IN GEORGIA

By Wilfred T. Neill

The taxonomy of the eastern milk snakes has undergone considerable revision in recent years. It has been demonstrated that the common milk snake and the scarlet king snake are conspecific, the two being connected by an intermediate form ranging from New Jersey to North Carolina (Conant, 1943, Proc. N. E. Zool, Club 22: 3). Apparently the scarlet king snake is to be known as *Lampropeltis d. doliata*, the common milk snake as *L. d. triangulum*, and the connecting form as *L. d. temporalis* (Klauber, 1948, Copeia 1: 1). The nomenclatural shift is unimportant, and Conant's taxonomic allocations are convincing; but it must be pointed out that the respective ranges of *L. d. doliata* and *L. d. triangulum* overlap without evidence of intergradation between the two forms.

There have been quite a few records of *L. d. triangulum* from the Piedmont and Coastal Plain south of North Carolina, but Conant has ably disposed of most of these. No doubt the form may be excluded from the Florida herpetofaunal list; and apparently there are no authentic records from Georgia. However, the milk snake does occur in the mountainous northeastern corner of Georgia, in Rabun and northern Habersham counties. Reports of the form in the Georgia Piedmont are apparently based upon juvenile *L. calligaster rhombomaculata*, and there is no reason to believe that the milk snake occurs outside the Transition Zone in this state.

The scarlet king snake, *L. d. doliata*, is found throughout the Coastal Plain and Piedmont of South Carolina and Georgia. Conant reports the form at the Tau Rock Vineyards near Tryon, North Carolina, a steep, rough area 1200 to 1500 feet in altitude (*op. cit.*: 20); and King records it from the Great Smoky Mountains (1939, Amer. Midl. Nat. 21: 573-4). These records indicate that the snake is tolerant of upland conditions; and accordingly it is not surprising to find it also in the Transition Zone of northeastern Georgia, in Habersham and southern Rabun counties. Its range overlaps that of *L. d. triangulum* by at least 15 miles. Contrary to what might be expected, *L. d. doliata* is much the commoner in the area of overlap. No intergrades have been noted, the two forms apparently maintaining their respective identities.

It is felt that the occurrence of the two forms in the same area does not necessarily invalidate Conant's contention that they are conspecific. Several recent taxonomists have embraced the concept of a chain of subspecies with overlapping ends, the terminal forms separated by some ecological factor (*cf.* Mayr, 1942, "Systematics and the origin of species"; Fitch, 1948, Copeia 2: 121). The milk snake and the scarlet king snake, do not seem to be separated in the area of overlap by any decided habitat preference; but the marked disproportion in size between the two forms might effectively prevent interbreeding.

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THE IDENTITY OF *Malacoclemmys kohnii* BAUR

By Archie Carr

Within the past few years I have had the opportunity to examine considerable material of the *Graptemys pseudogeographica* complex of North American fresh water turtles. Certain points which would modify somewhat the current concept of the group seem worthy of mention. These are as follows.

1. Two forms of Graptemys, *oculifera* and *kohnii*, were described by Baur (1890, Sci., 16: 262-263) from the Gulf Coast. It appears that but one of these has real taxonomic existence, the other being a variant which may approximate the phenotype of a Central Texas form described by Stejneger (1925, Journ. Washington Acad. Sci. 15: 20: 463) as *G. p. versa*. The characters of the bulk of the Gulf Coastal population are such that as a whole it is clearly referable to Baur's *kohnii*, while the variant represents his *oculifera*. The correct name for a southern race of *pseudogeographica*, if only one is to be recognized, is thus *kohnii* and not *oculifera*, a reversal of the usage of some authors.

2. The most constant and conspicuous difference between *kohnii* and *pseudogeographica* is the arrangement of stripes on the side of the head, as indicated in the accompanying figures. In *pseudogeographica* the anterior, expanded portion of the downward-trending dorsolateral head stripe stops about half way down the vertical diameter of the eye and three to eight lower stripes extend past this truncate stripe to the posterior rim of the orbit. In *kohnii*, on the other hand, this principal dorsolateral stripe extends downward and forward to a point beneath the orbit, thus excluding from the orbital rim all lower head stripes.

3. The *kohnii* condition is not restricted to turtles of the Gulf Coastal area. It extends northward in the Mississippi Valley to northern Arkansas and northwestern Tennessee and westward through the eastern third of Texas.

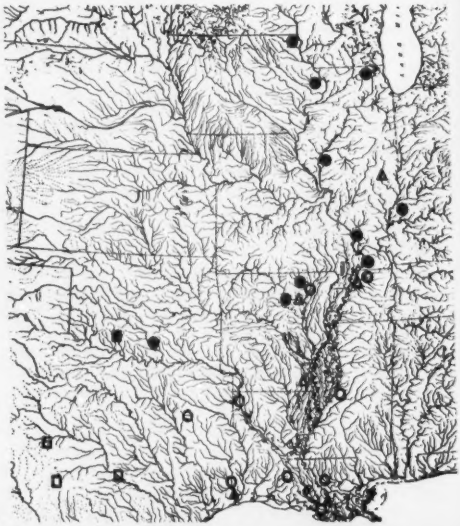
4. Overlooking a number of local tendencies which are implied but not elucidated by the rather scattered available material, the *P. pseudogeographica* group appears to include three major stocks, *versa*, *kohnii* and *pseudogeographica*, all separable on the basis of head pattern. As stated above, the expanded blotch or band behind the eye in typical *pseudogeographica* is the downward and forward trending extension of a dorsolateral head stripe. In *versa* the stripe segment behind the orbit is described as the *upward* extension of a *lateral* stripe; in other words it projects dorsally rather than ventrally from the stripe that gives rise to it. In a series of five live specimens from Fort Sill, Southwestern Oklahoma, loaned me by Mr. Charles Bogert of the American Museum of Natural History, the postocular mark tends to be detached from all stripes. It may be that this series represents a recognizable subspecies. For want of material from intervening areas, however, I tentatively regard the specimens as intergrades between *pseudogeographica* and *versa*, which they certainly are, whether or not they come from a locally homogeneous population of similar individuals.

5. I have seen evidence which appeared to indicate that the rather general confidence among herpetologists regarding the trenchancy and significance of differences between *Graptemys geographica* and *G. pseudogeographica* may be unjustified. These two complexes have in part different geographic distribution and certainly represent distinct

entities in some sections of their shared range. However, they are nevertheless widely misidentified in collections and I have seen several specimens which according to my lights were intermediate between the two groups, as indeed is the entire population of *G. barbouri* Carr and Marchand and probably that of *G. pulchra* Baur also. The sometimes striking differences exhibited by the two groups are mostly characters of the skull and jaws which have to do with diet and feeding habits and are subject to strong, but purely phenotypical, variation. I venture to suggest that when more material accumulates a careful zoogeographic study of the genus throughout its range will divulge some interesting and surprising relationships between these so-called "good species."

Escuela Agricola Panamericana, Honduras

Head patterns of two Mississippi Valley races of *Graptemys pseudogeographica*. Left, *G. p. pseudogeographica*; right, *G. p. kohnii*.



Map showing distribution of specimens of the *Graptemys pseudogeographica* complex examined. The three records for *G. p. versa* were taken from the literature and were included for purposes of reference, but all the rest, comprising 26 localities, involve material actually seen by the writer. EXPLANATION OF THE SYMBOLS: Solid circles, *pseudogeographica*; hollow circles, *kohnii*; hollow triangles, intergrades, *kohnii* X *pseudogeographica*; solid triangles, intergrades, *kohnii* X *versa*; hollow squares, *versa*; solid squares, intergrades, *versa* X *pseudogeographica*.

SOME PRINCIPLES OF TAXONOMY: THE MEANING OF "OCCUPANCY" AND "VALIDITY"*

by *Hobart M. Smith*

Perhaps no words are more often used incorrectly by systematists and their colleagues than "occupancy" and "validity". They are often used interchangeably and with at least three different meanings. For the sake of clarity of thought it is essential that an attempt be made to use the terms properly, if indeed there is such a thing as "proper" usage. Fortunately, there is more than custom on which to base a restriction of meaning. In fact a restriction based upon custom would be well-nigh impossible since customs vary with different individuals, despite the existence of official definitions.

Let us consider separately each of the ideas that have been and are at times conveyed by these words.

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I. Publication

This idea can best be conveyed by the term "published". A published name is simply one that has appeared in print and has been publicly distributed. Whether it was proposed in compliance with the International Rules of Zoological Nomenclature is immaterial in consideration of its status as "published" or not. In reality the International Commission on Zoological Nomenclature has avoided definition of publication. Strangely enough cases frequently arise in which the "publication" is actually in doubt. What, for instance, about mimeographed materials? Or printers proofs? Or privately printed papers? Or descriptions published in newspapers? Certain forms of publication, even of the preceding list, have been dealt with by the Commission, but it maintains the right to consider each dubious case on its own merits. I am nevertheless confident that the term "published" is applied here in a manner that conforms with usual practice.

A recent attempt was made to use the term *"occupied"* in the sense that *"published"* is here used - without general approval. There are, I believe, theoretical advantages in distinguishing between (a) publication in unscientific journals or by unscientific men, and (b) publication in scientific journals or by scientists. The word *"occupied"* was, in the attempt mentioned, applied to names of the latter sort--published in scientific journals or by scientists. The International Commission has however concluded that such a general distinction, between scientific and unscientific publication, is impossible, although it is quite willing to consider individually any special case. Moreover common usage at the present time makes the word "occupied" a name for another concept (see next section). This is the definition and usage here recommended. "Preoccupied" names are antedated by earlier, identical names.

The Commission has agreed that certain names are never to be considered as occupied. They include *prelinnaean names (i.e.*, names published before January 1, 1758), *nomina nuda (i.e.*, names published without indication of the exact species in nature to which they belong),

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*Dr. Smith was the author of a note upon this subject in Science, Vol. 106, p.11, July 4, 1947. Read at the meeting of the Pacific Division of the A.A.A.S. at the U. of Cal, June 22, 1948.

polynominals (i.e., names of which either the generic or specific part consists of more than one separate word), and mythological and other unscientific names *(i.e.*, names published in popular literature or in jest).

II. Occupancy

A second concept involved is of simply "legally acceptable" names that have been, of course, published. It includes any and all published names which were *proposed* in conformity with all the demands of the International Rules of Zoological Nomenclature. *Any such name is to be termed occupied.** Opinion 126 (p. 12) suggests the term "available", but the name is inappropriate, as indicated in the final section of this paper.

Let us review what this means. It means that a name may be published, and still not be approved for use as the name for a species of organism. It means that for a name to be even considered for use it has to be proposed properly. The properly proposed names are termed "occupied" and the improperly proposed ones are termed "unoccupied". It is very important to remember that in *"publication" of a name only the mechanics of printing and distributing* the medium for the name (i.e., the journal, book or pamphlet) *is involved,* while in *making a name "occupied" it is the proposal* (not publication!) *which is involved.* Not infrequently the ideas of what is involved in "publication" and in "proposal" are confused.

The distinction then between "published" and "occupied" names is, briefly, that "published" names are names properly published, and "occupied" names are names properly proposed as well as properly published. Conversely, improperly proposed names that have been properly published are regarded as *unoccupied. Only occupied names are to be considered in problems of validity and priority.* Unoccupied names, even though *published,* cannot be involved in any such considerations, and therefore are never cited or listed in generic or specific indices. They have absolutely no significance in taxonomy, other than as curiosities.

The nature of a proper proposal is indicated by Articles 2 and 25 of the International Rules. Article 2 states that "The scientific designation of animals is uninominal for subgenera and all higher groups, binominal for species, and trinominal for subspecies". Obviously exceptions to this rule are not "properly" proposed.** Article 25 adds two more limitations:*** (1) that the name be published in company with

*It is also, perhaps more generally, known as *available*. This term may be considered a synonym of occupied, although it has not, so far as I am aware, actually been defined by the International Commission. Its usage has been rather consistent, I believe, to express the idea frequently associated with the term *occupied*. For a further discussion of the word "available" see the terminal paragraph at the very end of this paper.

**Article 15 adds that *compound* words do not form an exception. The words may be hyphenated, like *sanctae-martae*, but not separate. It is important to remember that a compound word is one whose parts are linked either directly (like *robertmulleri*) or with a hyphen. Separate words, like *baronis mulleri*, are not compound words.

***These limitations are the only ones imposed upon names proposed prior to January 1, 1931. On and after that date the names must also be accompanied by a diagnosis or reference to a diagnosis, and generic names must be accompanied with a definite selection of the genotype.

an indication or definition or description, and (2) that the author has applied the principles of binary* nomenclature. The first requirement is, of course, essential for correct application of the name to the species in nature; it is imperative to know to what the name should be applied. The second requirement is of importance chiefly in consideration of old works, some of which were written before complete uniformity had been obtained in adherence to the Linnaean system of binary nomenclature. Rare indeed is the author since 1900 who has not adhered to this system.

All taxonomists are agreed that any name originally proposed with the same combination of generic and trivial name *(i.e., primary homonyms)* as some earlier name, also in its original form, is to be permanently rejected. They are not agreed upon, however, and no uniformity of procedure has been established for, the permanency of rejection of those names not homonymous when first proposed but which later become homonyms as a result of changes in their own combination or in that of other names.

III. Validity

The third concept involved is of the single name currently proper for any given species. It is an unfortunate fact that the name now used for any species may, by discovery of previously unknown facts about the use of that and other names in the past, be changed. In other words a "valid" name now may become "invalid" in the future, and names now "invalid" may become "valid". *Any "occupied" name with the exception of primary homonyms, may at some time become a "valid" name.* Nevertheless at any one time, given a certain set of known facts, one name and one name only is the proper one to be used for any given species. *That name is the valid name and all other names that have been applied to that species are invalid.* Authority for this restriction of meaning of the word is given in Opinion 126 (p. 12).

Of course, for any single species, many names may be properly published, and of those many may be properly proposed. But only one of them can be valid at any given time. The valid name is selected by a great variety of means, but the chief ones are by elimination of all but the earliest homonym** and/or synonym.

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*Binary (or binomial) as used in nomenclature means a two-category method of naming, to wit, (1) the generic name, and (2) the species name with, if any, a subspecies name. It is perhaps clearer to regard the second portion of the name as the "trivial" name (as is widely done by taxonomists) to avoid confusion. Thus the scientific name can be said to consist of two parts, the generic name and the trivial name, and thus is a two-category or binary name. Binomial is generally considered to mean the same as *binary*.

Binominal, on the other hand, means "two names", and refers to the actual number of words in the scientific name. Obviously in the binomial system of nomenclature both *binominal* and *trinominal* names are acceptable, since all scientific names of subspecies are trinominal.

**It is an unfortunate anachronism that taxonomists generally apply both of the terms homonym and synonym to the invalid names, the valid one being considered neither a homonym nor a synonym. Actually, of course, any two identical names are homonyms, whether one was proposed before the other or not; likewise any two names for some object are synonyms, regardless of date of publication. To avoid confusion some taxonomists specify the earlier (older) name as the *senior* name, while

In other words a name "valid" now may become "invalid" in the future, and names now "invalid" may become "valid". *Any "occupied" name with the exception of primary homonyms, may at some time become a valid name.*

Homonyms are identical names proposed for two or more different (rarely the same*) genera, species, or subspecies. No two genera of *animals* can have the same valid name (Article 34), and no two species or subspecies in a single genus can have the same valid name.

Synonyms are different names applied to one and the same thing (genus, species or subspecies). Any two given names may be regarded as synonyms for either zoological or nomenclatural reasons. By "zoological" reasons is meant comparison of one named specimen or population with another differently named specimen or population, with the conclusion that both belong to a single species (or genus). The two names thus apply to one and the same thing, and are synonymous; the older name (unless ruled out for other reasons) is the valid one. Such grounds for determining synonyms are subjective grounds, and in fact some workers prefer to call synonyms so established "subjective synonyms" instead of *zoological synonyms*. By "nomenclatural" reasons is meant by direct substitution of one name for another. No reference to the animals themselves is necessary in consideration of nomenclatural synonyms. Since nomenclatural synonyms are determined by objective reasoning, the alternative terms *"objective synonym", "exact synonym",* and *"strict synonym"* have been used by some taxonomists. The term "nomenclatural" and "zoological" are used in Opinion 126 (p. 12), however, and therefore have official approval of the Commission.

An interesting rule (Article 36) states that rejected homonyms can never be used again, while rejected synonyms can, other conditions permitting. Since a great many species have received more than one name, a large proportion of name changes involve "revival" or "resurrection" of previously rejected synonyms in order to become valid names and to take the place of names that newly uncovered evidence of zoological or nomenclatural nature reveals are either invalid or not occupied for the given species.

It has been implied that all occupied names are definitely either valid or invalid. Unfortunately this is not so. Some are of dubious allocation. According to Opinion 126 (p. 12) such names *(nomina dubia)* can be rendered either valid or invalid by the first reviser who wishes to make a decision on the matter.

Examples

In the accompanying table a series of examples are given to illustrate the various situations described. For a full understanding of these examples the pertinent facts for each name listed are cited in the following paragraphs.

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*The term "synonymic homonym" may well be used to denote homonyms which apply to the same species (or subspecies) while the term "antonymic homonym" may be used to denote homonyms which apply to different species (or subspecies).

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the later (younger) names are *junior* names. Thus, by the Law of Priority (Article 25 of the International Rules, which states that the valid name can be only the *first* name, on certain conditions previously mentioned), the valid name among several applied to one species would be the *senior homonym* or the *senior synonym*, while all others would be *junior homonyms* or *junior synonyms*.

1. *Scincus americanus* Petiver 1711. Zoological nomenclature begins, according to the International Rules (Article 26) with the 10th edition of Linne's "Systema Naturae", 1758. By Opinion 3, the International Commission established January 1, 1758, as the date of publication to be accepted. No names proposed before that date, no matter how well supported, can be accepted. Furthermore, according to Opinion 5, such "Pre-Linnaean" names are not to be considered as properly "proposed" even though cited (published) after 1758, unless the later proposer (who becomes the acknowledged author) adopts and accepts the name.

2. *Henicognathus annulata cyclura* Cope 1886. This name was published in a list of species, but was accompanied by no "indication, definition or description" whatever. Such names are called *nomina nuda*, and according to Article 25 cannot be considered occupied.

3. *Coluber novae Hispaniae* Gmelin 1788. This name was proposed for a *species* of snake, and therefore should have been binominal (Article 2). Since it was trinominal the name is not occupied.

4. *Sceloporus bairdandgirardi* Schneider 1939. Since this name was properly printed and distributed, it may be considered "published";* but it can be considered unoccupied on the grounds of being unscientific, therefore violating Article 2 of the International Rules, which admits only "scientific designations", not unscientific ones such as this.

5. *Heloderma europaeum* Nicolussi 1934. This name was proposed for an animal of which the only evidence was a photograph, which itself may have been a hoax (see Willy Ley, "The Lungfish and the Unicorn", 1941, pp. 109, 110). Such names, for mythical species, can be considered unoccupied on the same grounds as Example 4: they are unscientific.

6. *Bascanion semilineatum* Cope 1892. Properly published and proposed, this name is occupied. It is, however, based upon the same species that Jan named 30 years before (1863) as *Masticophis bilineatus* - a name still in use. Therefore Cope's name, as a "junior" synonym, is invalid. It is, to be precise, a junior zoological (= subjective) synonym.

7. *Coluber arizonae* Boulenger 1894. This name was proposed as a substitute for *Coluber elegans* (Kennicott, 1859), applied to an American snake and which is suppressed as the junior homonym of *Coluber elegans* Shaw (1802), applied to an African species. However, the names of Kennicott and Shaw are not primary homonyms (see p. 13) since Kennicott originally proposed the name in the genus *Arizona*. Matters came to a head only because Boulenger in 1894 wanted to place Kennicott's species in the genus *Coluber*, but felt he could not do so since Shaw had already used the name *Coluber elegans* for a different species.**

It is the unfortunate truth that the International Commission has not determined the proper policy for such cases. According to some authors, who interpret the "Homonym Rule" (Article 36) broadly and permanently suppress *all* junior homonyms, no matter how they become homonyms, Boulenger's reasoning was correct, and Kennicott's name cannot be revived even though its species is placed in another genus (e.g.,

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*It appeared in a humorous publication of the American Society of Ichthyologists and Herpetologists, "Ichtherps", still available for purchase from the Secretary of the Society.

**In spite of the fact that Boulenger himself no longer placed Shaw's species in *Coluber*, but in a completely different genus *(Psammophis)*

Arizona, as it is now). Such authorities would consider *arizonae* Boulenger as valid, *elegans* Kennicott as invalid. Most authorities, however, and I here follow them, interpret Article 36 strictly and suppress permanently only primary homonyms (see p. 13). According to them Boulenger's reasoning was unwarranted even at the outset, and his action at any rate could not invalidate Kennicott's name for use in a genus *(Arizona)* different from *Coluber*. They regard *arizonae* Boulenger, then, as a nomenclatural (=objective) as well as a zoological junior synonym of *elegans* Kennicott.

8. *Agama torquata* Peale and Greene 1830. Independently Wiegmann in 1828 (with *Sceloporus torquatus)* and Peale and Greene in 1830 proposed two identical names that all authors agree must be referred to one genus, *Sceloporus*. According to Article 35, the later name must be rejected as a junior homonym. In this particular case both names apply to the same species and subspecies (a rare occurrence) and accordingly the name is, to be precise, a junior synonymic homonym.

9. *Eleutherodactylus ranoides nubicola* Dunn and Emlen 1932. The subspecific name is "preoccupied" by the name *Eleutherodactylus nubicola* Dunn 1926, applied to a different species. Accordingly Dunn and Emlen's name is a junior antonymic homonym, and there is invalid.

10. *Salvadora grahamiae* Baird and Girard, 1853. The name *grahamiae* was not, before 1853, applied to any other member of the present genus *Salvadora*, nor was the species to which the name is applied named previously by either the same or a different name. Not invalidated by these or other means, the name is valid.

Summary

1. From the viewpoint elaborated herewith, scientific names of animals can be summarized as follows:

- unpublished
- published
  - occupied
    - valid
    - invalid
      - homonyms
        - synonymic
        - antonymic
      - synonyms
        - zoological (= subjective)
        - nomenclatural (= objective) = strict = exact
    - dubious
  - unoccupied
    - polynominals* and polynominals**
    - mythological names
    - defective names
    - prelinnaean names
    - naked names

2. Published names are those properly published (i.e., properly printed and distributed) according to the International Commission on Zoological Nomenclature (no all-inclusive Opinion yet published).

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*That is, names more numerous than 1 for a genus, 2 for a species or 3 for a subspecies.

I.e., names based upon a concept of more than the two categories expressed by the generic and the trivial names (Cf. footnote *, page 12 of this paper).

3. Occupied names are those published names properly proposed in accordance with Articles 2, 15 and 25 of the International Rules. All other published names are unoccupied.

4. Valid names are the currently accepted names selected from all occupied names, one and one only for each species and subspecies.

The Smithsonian Institution Committee on Zoological Nomenclature has agreed, in consultation with myself and others interested, to request approval for application of the term "available" to those occupied names not automatically rendered invalid by fault of being primary homonyms. Thus two groups of names, subdivisions of the "occupied" group, should be recognized: (1) available names, which may in turn be "valid", "invalid" or "dubious", and (2) unavailable names, which are primary homonyms and thus never under any circumstances are available for consideration as valid names. If the Commission ever rules that secondary homonyms as well as primary homonyms are "stillborn", then they too will become unavailable. At the present time only primary homonyms may be so considered.

A further suggestion by the Smithsonian Institution Committee is use of the name "correct" in place of "valid", as here discussed. The former term has the advantage of being immediately obvious in meaning, while "valid" is not. The latter name, however, having been used in the Opinions, may carry some measure of official sanction and priority, especially worthy of consideration since the meaning and application of the word are neither inappropriate nor conflicting.

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* * *

A RECORD LITTER OF *Thamnophis sirtalis proximus*

Dissection of a preserved 32 inch female Western Ribbon Snake, *Thamnophis sirtalis proximus* (Say) that I collected at San Antonio, Texas during May, 1948 disclosed 27 embryo young, which I believe is the record for the Ribbon Snakes.

Schmidt and Davis in their "Field Book of Snakes of the United States and Canada" recorded thirteen Ribbon Snake broods, giving an average of ten and a maximum of twenty, while Ditmars gives "about a dozen" as the average and mentioned one of *proximus* numbering fifteen.

As *proximus* reaches a larger average size than either the eastern or southern species, particularly in southwestern Texas, it's possible that it may have larger numbers of young. The fact that young Ribbon Snakes seem more abundant along the streams of San Antonio than the juveniles of any of the other common species may tend to verify this.

It may be of interest to add that I have collected large numbers of both adult and young Ribbon Snakes with *Natrix rhombifera, Natrix erythrogaster transversa,* and *Natrix grahami,* around small, rapidly drying pools on the San Antonio river at the beginning of the dry season gorging themselves with trapped tadpoles, fish, and frogs which were so numerous that they could be scooped out with one's hands literally by the hundreds. Many of the snakes, particularly the juveniles ate themselves to death.

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TABLE OF EXAMPLES

All printed and distributed publicly, therefore are PUBLISHED, whether they are occupied or not.	1. *Scincus americanus* Petiver, 1711	Not proposed in accordance with International Rules; therefore not occupied, hence neither valid nor invalid
	2. *Henicognathus annulata cyclura* Cope, 1886	
	3. *Coluber novae Hispaniae* Gmelin, 1788	
	4. *Sceloporus bairdandgirardi* Schneider, 1939	
	5. *Heloderma europaeum* Nicolussi, 1934	
	6. *Bascanion semilineatum* Cope, 1892	Proposed in accordance with International Rules, and hence OCCUPIED
	7. *Coluber arizonae* Boulenger, 1894	
	8. *Agama torquata* Peale and Greene, 1830	
	9. *Eleutherodactylus ranoides nubicola* Dunn and Emlen, 1932	
	10. *Salvadora grahamiae* Baird and Girard, 1853	

1.	PUBLISHED; UNOCCUPIED.	Pre-Linnaean; i.e., published before January 1, 1758.
2.	" "	Nomen nudum; i.e., no diagnosis or definition, etc.
3.	" "	Trinominal for species instead of binominal.
4.	" "	A name proposed in jest.
5.	" "	A mythical species.
6.	PUBLISHED; OCCUPIED.	INVALID: a zoological synonym of *Masticophis bilineatus* Jan, 1863.
7.	" "	INVALID: a nomenclatural synonym of *Arizona elegans* Kennicott, 1859.
8.	" "	INVALID: a synonymic homonym of *Sceloporus torquatus* Wiegmann, 1828.
9.	" "	INVALID: an antonymic homonym of *Eleutherodactylus nubicola* Dunn, 1926.
10.	" "	VALID: neither a synonym nor a homonym of another name.

JUVENILES OF *Siren lacertina* AND *S. i. intermedia*

By Wilfred T. Neill

Apparently the juveniles of *Siren lacertina* and *S. i. intermedia* have never before been described or figured—a surprising fact, since both forms are common in the southeastern United States. On May 18, 1948, I collected in northern Emanuel County, just across the Ogeechee River from Midville, Burke County, Georgia. Thirty young *S. intermedia* and two young *S. lacertina* were dipped from a shallow flatwoods pond. (*S. intermedia* normally lives and breeds in such ponds; the young *lacertina* had probably been washed in by a freshet from the nearby river).

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The average length of the *S. intermedia* was 55 mm. from snout to tip of tail. The limbs were stout, the first and second digits long, the third and fourth short, all terminating in horny claws. Across the snout was a bright red band which extended well on to the upper surface to form a triangle, the apex on the mid-line. The bright red also continued around the side of the head in an irregular band almost to the gills. The distal two-thirds of the gill rachises were bright red, as were the tips of the digits and the tail tip. The posterior portion of the caudal fin was red-edged above. The remainder of the animal was gray-brown above and below. There was no trace of an occipital marking as in the young of *S. i. nettingi*. A dorsolateral and a ventrolateral row of yellowish pores were present, constituting lateral line organs. The pores were not circular openings, but longitudinal slits, about two on each costal interspace.

The *Siren lacertina* averaged 39 mm. in total length. The limbs were slender, the digits long, terminating in horny claws. The edge of the upper lip was bordered by a yellowish-white line which faded into the similarly colored throat. A light yellowish stripe extended the length of the body from the base of the gills to the level of the vent. A less distinct yellowish ventrolateral line was also present. The caudal fin (which extended well on to the body dorsally) was clear yellowish-white. From above the fin resembled a vertebral stripe, and the animals strongly suggested *Pseudobranchus*. There was an irregular brownish line from the eye to the base of the gills. The ground color was dark brown above, becoming lighter below. A white midventral line was present. The form and pattern of young *Siren* are indicated in the accompanying drawings.

On July 18, 1948, Mr. Francis L. Rose and I investigated the same small pond, securing 46 *S. intermedia* but no *lacertina*. The *intermedia* now averaged 95 mm. in total length. The caudal fin was greatly reduced. The red markings on head and gills remained, but all other red had disappeared. In a few specimens the head was olive-brown with a scattering of black dots.

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ANNOUNCEMENT

The Herpetologists League will meet with the Pacific Division of the A.A.A.S. at Vancouver, B.C., June 13-18, 1949. If any member planning to attend has or will have a paper for presentation, please contact Editor immediately.

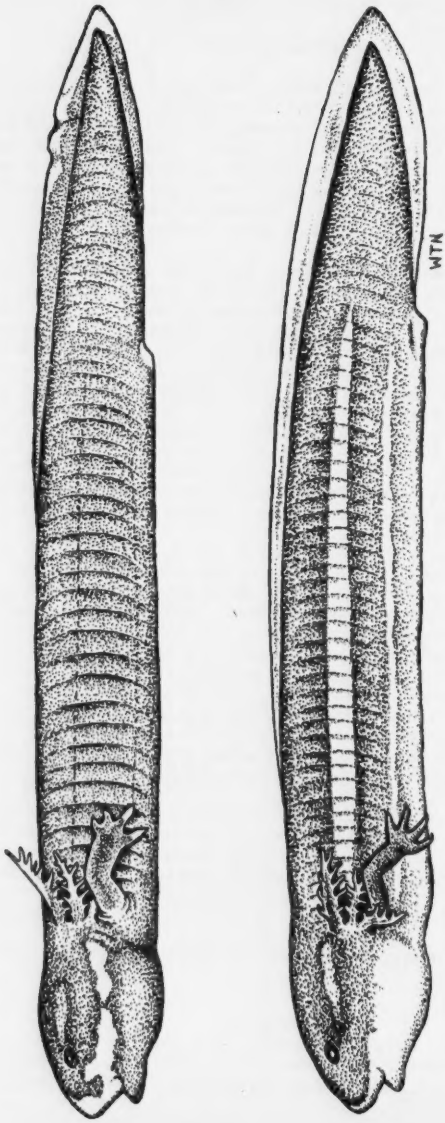

Fig. 1: UPPER: *Siren i. intermedia*, 55.5 mm. total length. Emanuel County, Georgia.
LOWER: *S. lacertina*, 38.8 mm. total length. Emanuel County, Georgia.

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